Multiwalled sack-type packaging

The invention relates to a multiwall sack-like packaging medium for particulate materials, especially powdery materials.

Powdery materials, for example polymer powders, are brought onto the market packed in what are known as valve sacks. In this case, filling is carried out by filling machines, which run at a high throughput rate and put the powder into the sack in a state in which it is fluidized with a great deal of air. Here, the air must escape from the sack as quickly as possible. In the past, the packaging material used was paper sacks made of kraft paper, since the air can escape through the paper while the powdery filling material is kept back. However, paper sacks have the disadvantage that they withstand spray and moisture only to an inadequate extent and are sensitive to mechanical loading.

In order to overcome these disadvantages, at present multiwall valve sacks are used which, on the inside, consist of a paper sack which is surrounded on the outside by a sack made of plastic film, normally polyethylene film. In order to ensure a rapid escape of air during filling, the plastic film surrounding the paper sack is perforated, at least over a subregion of the area. Therefore, although the mechanical strength is increased considerably as compared with paper sacks, the penetration of moisture cannot be suppressed entirely, on account of the large-area perforation.

There was therefore the object of developing a packaging material, in particular for powdery material, which permits the air to escape as quickly as possible during the filling operation and which, during storage, prevents rewetting from the surrounding air as effectively as possible, and also provides protection against spray.

The subject of the invention is a multilayer, sack-like packaging medium 1, which is configured such that in each case it has a broad front side 3 and rear side 2, which are joined by narrow side areas 4 and 5, and is closed at the upper end 6 and lower end 7, an opening 8 for filling being kept free at the upper end 6, and the packaging medium having an inner wall 9 made of air-permeable material which is surrounded by an outer wall 10 of air-impermeable material, characterized in that

a) on the front side 3 and/or the rear side 2, the outer wall 10 overlaps over a subregion 11 of up to 50% of the total area,

b) in the overlap region 11, the inner layer 10a of the outer wall 10 is perforated,

c) at the edges 12 and 13 of the overlap region 11, the two layers 10a and 10b lying one above the other are joined to each other by means of seams 14 and 15,

d) at one or both edges 12 and 13, the joint is interrupted in a region 16 which covers 10 to 50% of the total length.

Suitable air-permeable materials for the inner layer 9 are paper, woven materials or nonwoven materials made of artificial fibres or natural fibres. Preference is given to paper, for example conventional kraft papers having a grammage of 30 to 120 g/m^2, preferably 60 to 90 g/m^2. For the air-impermeable outer walls 10, the plastic films which are usual in the packaging sector are suitable, preferably polyolefin films such as polyethylene or polypropylene films and PVC films. The film thickness is generally 20 to 200 µm.

When filled, the packaging medium 1 has a box-like shape. The length is preferably between 30 and 120 cm, particularly preferably 60 to 100 cm. The width is preferably 20 to 80 cm, preferably 40 to 60 cm. The width of the side parts is preferably between 5 and 30 cm, particularly preferably 10 to 20 cm.

The opening (filling (valve) opening) 8 at the upper end of the packaging medium 1 preferably has a round or square cross section and is dimensioned such that the sack 1 can be filled via a filling nozzle. In general, diameters from 5 to 20 cm are adequate. In order to close the sack, the inside of the opening 8 is generally coated with a plastic material, preferably hot melt and/or thermoplastic (for example polyethylene). This permits the opening to be welded by means of ultrasound or heat.

The inner, air-permeable material 9 is joined to the outer, air-impermeable material 10 by adhesive bonding. A paper inner layer 9 is preferably adhesively bonded to an outer plastic film 10 only at the upper end 6 and at the bottom 7. During the production, the procedure is such that the individual layers of the sack are run away from the roll into the production line and are led together. An endless tube is formed and the latter is cut appropriately to length. The ends are then folded, the valve opening is inserted and adhesively bonded. Finally, a covering sheet is adhesively bonded to both ends of the sack.

The outer material 10, generally plastic film, overlaps over a subregion 11 of up to 50% of the total area of front or rear side 2, 3, on the front side 3 or on the rear side 2 or on both sides. The outer wall 10 preferably overlaps only on one of the two sides, particularly preferably only on the rear side 2, which is the side on which the sack generally rests. In a further preferred embodiment, the plastic film overlaps over the entire length. The overlap region 11 preferably amounts to 10 to 50% of the total area of the respective side.

In the overlap region 11, the inner layer 10a of the plastic film is perforated. The perforation density is generally 0.5 to 5 holes per cm^2. The perforation can

be applied by means of needling over the entire overlap region 11 or a subregion. 10 to 50% of the area of the overlap region 11 is preferably provided with the perforation. Perforation is preferably carried out over the entire length of the overlap region. A distance of 0.5 to 10 cm from the edges 12 and 13 of the overlap region 11 is particularly preferably maintained, the distance to the edge 12 of the overlap region, which is open, preferably amounting to 2 to 10 cm. The hole size, perforation density and the perforated area depend substantially on how high the passage of air during filling must be. Depending on the requirements, these variables can be adjusted within the above-mentioned limits by those skilled in the art.

At the edges 12 and 13 of the overlap region, the inner layer 10a and the outer layer 10b of the plastic film are joined to each other, for example with an adhesive seam or welded seam (14, 15). In order to permit the air which escapes on account of the perforation to emerge, the joint is interrupted at one or both edges, preferably only at one edge. In general, the joint is interrupted in a region 16 which covers 10 to 50% of the total length. The interruption is preferably located in the upper half, particularly preferably in the upper third, of the packaging medium 1, since the residual air is situated at the top during the filling operation.

With this construction, it is firstly ensured that the air can emerge quickly during the filling, in spite of the outer walls made of plastic film. During storage of the filled sacks, the opening in the overlap region is closed by the inherent weight of the filled packaging medium, with the effect that no atmospheric moisture or spray can enter the interior via the perforation.

The packaging medium is suitable for the transport and the storage of particulate materials, such as granules, fibres or fine-grained or coarse-grained powders. The packaging medium is particularly suitable for materials that are sensitive to moisture. Examples of these are polymer powders, in particular polymer powders that can be redispersed in water (dispersion powders) or else highly disperse silica, cement, gypsum, dry mixtures containing cement or gypsum such as dry mortar, flour, animal feed, water-soluble, powdery substances such as cement plasticizer, thickening agent.

The sack can be labelled, printed or provided with labels in the usual way.

Preferred refinements of the invention are reproduced by using the following drawings.

Figure 1 shows a perspective illustration of sack 1 in the empty state.
Figure 2 shows an enlarged partial detail according to the region II in Figure 1.

Figure 1 shows a perspective illustration of sack 1 in the empty state, which has a first broad side 2 (rear side) and a second broad side 3 (front side), a first narrow side area 4 and a second narrow side area 5. The sack is closed at the ends 6 and 7, a filling opening 8, not illustrated here, for filling the sack 1 being provided in the region of the end 6 (upper end) to accommodate a filling pipe.

As can be seen in Figure 2, the sack 1 has an air-permeable inner wall 9 which is surrounded by an air-impermeable outer wall 10. The outer wall 10 is designed to overlap in a subregion 11 of, for example, the first broad side 2, the edges 12 and 13 of the overlap being joined in an airtight manner to the outer

wall 10 by means of seams 14 and 15, for example welded seams.

In this case, the seam 14 is preferably interrupted in the upper third in a region 16, forming an air outlet opening 17. The inner outer wall region 10a of the overlapping subregion 11 is provided close to the seam 15 with a perforation 18 which permits the passage of the air from the interior of the sack 1 into the channel 19, formed by the overlapping outer wall regions 10a and 10b and the seams 14 and 15 of the overlap, into the open air via the air outlet opening 17.